

### **Abstract**

A controller for an expansion valve of a refrigeration system for cooling a medium is configured to include, in the generation of a control signal, a measure of the evaporation temperature ( $T_0$ ) of the refrigerant in an evaporator and a measure of a property of the cooled medium, preferably without influence from a measure of the superheat temperature (SH) of the refrigerant. The controller comprises a PI-element for integrating and for producing a control signal for the expansion valve for controlling the flow of refrigerant into the evaporator, the PI-element being arranged in an inner control loop, a reference for which is produced by an outer control loop. The controller allows for fast response to disturbances and/or fast response of the medium temperature when the operating conditions of the refrigeration system are changed and/or fast response during start-up of the refrigeration system and maintains stable operation conditions with low, but positive superheating and a stable evaporation pressure.